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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,284	02/24/2003	Jean-Francois Helard	F40.12-0004	8724

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Minneapolis, MN 55402-3319

EXAMINER

SHINGLETON, MICHAEL B

ART UNIT	PAPER NUMBER
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2817

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/088,284	HELARD ET AL.	
	Examiner	Art Unit	
	Michael B. Shingleton	2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>March 13 2002</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

Claims 1, 11, and 12 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Applicant's Admitted prior art as represented by Figure 1 (AAPA).

AAPA discloses a structure that due to having the same basic structure as that of applicant's Figure 2 clearly provides a method for reception of a signal implementing a modulation with multiple carriers and with multiple access by division of spread codes of the type comprising a demodulation stage by application of a mathematical transform from the temporal domain to the frequency domain, an equalization stage of the transformed signal and a despreading stage of the equalized signal. The claims further recites that the equalization stage "takes into account" for each of the components of the transformed signal, disturbances affecting the carrier carrying the component and at least one other of the carriers and at least some of the spread codes. "Takes into account" is a broad limitation that is clearly present in AAPA. As with any equalization all factors are taken into account. This is the same with AAPA. The final results might be a simplification or an approximation that includes with a multiplication factor of one, but never the less these factors were taken into account. It might be found out that certain disturbances do not affect the final output very much and thus a multiplication factor of 1 is applied for these factors. Thus AAPA takes into account all factors including the ones recited by the claims and the resultant set of the equalization coefficients that were formed. "Takes into account" just does not set forth any specific function or equalization coefficients, i.e. it does not set forth equalization coefficients other than one and zero for a particular factor like "disturbances". Claim 1 is not specific on what the "disturbances" affecting the carrier component are, what the disturbances affecting the other carrier components are and what the disturbances affecting at least some of the spread codes are. Accordingly, these are considered broad limitations.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be

patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-7 and 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted prior art as represented by Figure 1 (AAPA) in view of Jeon et al. "An Equalization Technique for OFDM and MC-CDMA in a Time-varying Multipath Fading Channels" (Jeon).

The reasoning as applied in the above 35 USC 102 rejection involving AAPA and the following: AAPA is silent on having a non-diagonal transmission channel and hence a non-diagonal matrix of equalization coefficients. Having a non-diagonal transmission channel and hence a non-diagonal matrix of equalization coefficients is well known in the art. Note page 2531 of Jeon et al. and especially equation 21. Thus many factors are fully represented and corrected for in Jeon that is evidenced by the "H with a large size". Again the claims like claim 1 just do not set forth any specific relationship between the factors that affect the system and the matrix represented. Thus any matrix is considered as meeting such a broad limitation. Claims like claim 1 is even not specific on what the "disturbances" affecting the carrier component are, what the disturbances affecting the other carrier components are and what the disturbances affecting at least some of the spread codes are. Thus these can be any kind of disturbances which, accordingly, Jeon is seen as taking into account. Note equations like 20 and 21 of Jeon.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to represent more than one factor in the transmission channel and equalization matrix with values other than one or zero so as to get a more accurate equalization as taught by Jeon.

AAPA and Jeon are silent on the use of the Wiener filtering technique to determine weighting coefficients "globally as a whole". The use of Wiener filter techniques to determine weighting coefficients "globally as a whole" is well-known equalization technique so as to control the white noise response. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used Wiener filtering techniques to determine weighting coefficients so as to control factors like the white noise response as is well known in the art.

Note that one of ordinary skill in the art can appreciate that the equation presented by claims like claims 4 and 15 is sufficiently broad that it reads on the equation 21 of Jeon for the claimed equation does not exclude $C.A.C^T$ equal to "1" and I equal to "1".

Claims like claim 5 recites another well-known equalization technique. The specification does not provide a specific definition for "threshold value" and the fair and reasonable interpretation would be that

this is equal any amount including zero. (See MPEP 2111). Thus what is presented in claims like claim 5 is just a well-known approximation method or merely an optimization of parameters. For example even if the estimated noise power over the signal power turns out to be very small, i.e. zero, because it is common knowledge that there is always some non-zero noise figure then one of routine skill in the art would have used a theoretical approximation for this value so as to provide for a positive correction of such. This is just common engineering practice. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have approximated the noise power over signal power figure to be a non zero value when the noise power over signal power figure comes up as zero so as to provide for a positive correction for noise power as is well known.

Claims like claim 6 recites that "one implements" an alternative detection method when the noise power over signal power is lower than a threshold value. The specification does not provide a specific definition for "threshold value" and the fair and reasonable interpretation would be that this is equal any amount including zero. (See MPEP 2111). Likewise "an alternative detection method" is not defined by any specific definition in the specification. Accordingly, a fair and reasonable interpretation would be any detection method. When the noise power in Jeon is zero which would be lower than some predetermined threshold value then a new "alternative detection method" is defined for in the equation 21 of Jeon the noise power over signal power term is zero which defines a new equation.

AAPA and Jeon are silent on the use of an iterative procedure implementing a gradient algorithm to determine weighting coefficients. Applicant again fails to provide any specific definition for what is meant by an "iterative procedure implementing a gradient" nor does this define any specific relationship and thus since no specific relationship is set forth by the claims. However, to use of an iterative procedure implementing a gradient algorithm to determine weighting coefficients is a well-known procedure. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have use an iterative procedure implementing a gradient algorithm to determine weighting coefficients, as it is a well-known art recognized way to determine the weighting coefficients.

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Jeon as applied to claims 2-7 and 11-20 above, and further in view of Huang et al. 6,154,443 (Huang).

AAPA and Jeon both are silent on the use of an "annulment of multiple access interference" through a subtracter that is iterative, i.e. the subtraction operation is repeated over time.

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Figure 3a and 3b of Huang discloses a subtraction arrangement that subtracts out the multiple access interference from a "signal". Clearly this operation is iterative for the subtraction operation is repeated over time.

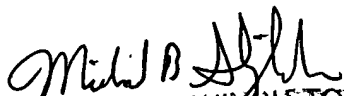
Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an additional stage of "equalization" composed of a subtracter that subtracts the multiple access interference from the signal in the arrangement of AAPA and Jeon so as to correct for multiple access interference as taught by Huang et al..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. Shingleton whose telephone number is (571) 272-1770. The examiner can normally be reached on Tues-Fri from 8:30 to 4:30. The examiner can also be reached on alternate Mondays. The examiner normally has the second Mondays of the bi-week off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal, can be reached on (571)272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MBS
December 1, 2004


MICHAEL B SHINGLETON
PRIMARY EXAMINER
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